

We claim:

1. An apparatus for collecting particles entrained in a gas from a source of gas and particles, the apparatus comprising:

a housing defining an enclosed chamber, the housing having an inlet opening providing fluid communication between the source of gas and particles and the chamber, and an outlet opening providing fluid communication between the chamber and the exterior of the housing, the outlet opening adapted to be connected to a fluid flow producing means for drawing gas and particles through the housing from the inlet opening to the outlet opening; and

a collecting member disposed in the chamber in the housing between the inlet opening and the outlet opening, the collecting member having an upper surface, at least a portion of the upper surface coated with an adhesive and positioned adjacent to the inlet opening so that the ratio of the distance between the inlet opening and the adhesive-coated surface to the diameter of the inlet opening is less than about 0.1,

such that, when gas and particles are drawn from the source of gas and particles and through the housing, the inlet opening directs the gas and particles at the adhesive-coated surface of the collecting member for capturing particles on the collecting member.

2. A particle collecting apparatus as recited in claim 1, wherein the housing comprises a first portion for sealingly connecting to a second portion, each of the first and second portions having an inner surface defining a recess, the inlet opening and outlet opening opening into the recess in the first portion and second portions, respectively, and the walls of the first and second portions defining the recesses forming the chamber when the first and second portions are sealingly connected, the longest planar dimension of the recesses at the inner surface of the first and second portions being less than the longest dimension of the collecting member so that the inner surfaces of the first and second portions engage the collecting member at two spaced points.

3. A particle collecting apparatus as recited in claim 1, further comprising a cap member having a pass through opening, the cap member adapted to be sealingly connected to the housing so that the pass through opening is in fluid communication with the inlet opening in the housing.

1 4. A particle collecting apparatus as recited in claim 1, wherein the distance between the inlet
2 opening and the surface of the collecting member is less than about 0.02 inches.

1 5. A particle collecting apparatus as recited in claim 1, wherein the diameter of the inlet opening is
2 less than about 0.2 inches.

1 6. An system for collecting particles from a source of gas and particles, the system comprising:

2
3 a housing defining an enclosed chamber, the housing an having an inlet opening providing fluid
4 communication between the source of gas and particles and the chamber, and an outlet opening
5 providing fluid communication between the chamber and the exterior of the housing;

6
7 means for producing a fluid flow, the outlet opening adapted to be connected to the fluid flow
8 producing means for drawing gas and particles from the source and through the housing from the
9 inlet opening to the outlet opening; and

10
11 a collecting member disposed in the chamber in the housing between the inlet opening and the
12 outlet opening, the collecting member having an upper surface, at least a portion of the upper
13 surface coated with an adhesive and positioned adjacent to the inlet opening so that the distance
14 between the inlet opening and the adhesive-coated surface of the collection member is less than
15 about 0.08 inches and the ratio of the distance between the inlet opening and the adhesive-coated
16 surface to the diameter of the inlet opening is less than about 1,

17
18 such that, when gas and particles are drawn from the source and through the housing, the inlet
19 opening directs the gas and particles at the adhesive-coated surface of the collecting member for
20 capturing particles on the surface of the collecting member.

1 7. A particle collecting system as recited in claim 6, wherein the housing comprises a first portion
2 for sealingly connecting to a second portion, the inner surface of each of the first and second
3 portions defining a recess, the inlet opening and outlet opening opening into the recess in the first
4 portion and second portions, respectively, and the walls of the first and second portions defining the
5 recesses forming the chamber when the first and second portions are sealingly connected, the longest

6 planar dimension of the recesses at the inner surface of the first and second portions being less than
7 the longest dimension of the collecting member so that the inner surfaces of the first and second
8 portions engage the collecting member at two spaced points.

1 8. A particle collecting system as recited in claim 6, further comprising a cap member having a pass
2 through opening, the cap member adapted to be sealingly connected to the housing so that the pass
3 through opening is in fluid communication with the inlet opening in the housing.

1 9. A particle collecting system as recited in claim 6, wherein the ratio of the distance between the
2 inlet opening and the surface of the collecting member to the diameter of the inlet opening is less
3 than about 0.5.

1 10. A particle collecting system as recited in claim 6, wherein the ratio of the distance between the
2 inlet opening and the surface of the collecting member to the diameter of the inlet opening is less
3 than about 0.1.

1 11. A particle collecting system as recited in claim 6, wherein the distance between the inlet
2 opening and the surface of the collecting member is less than about 0.02 inches.

1 12. A particle collecting system as recited in claim 6, wherein the diameter of the inlet opening is
2 less than about 0.2 inches.

1 13. A method for collecting particles from a source of gas and particles, the method comprising the
2 steps of:

3
4 providing a housing defining an enclosed chamber, the housing an having an inlet opening
5 providing fluid communication between the source of gas and particles and the chamber, and an
6 outlet opening providing fluid communication between the chamber and the exterior of the
7 housing, the outlet opening adapted to be connected to a fluid flow producing means for drawing
8 gas and particles through the housing from the inlet opening to the outlet opening;

9
10 providing a collecting member;

12 coating at least a portion of the upper surface of the collecting member with an adhesive;

13
14 positioning the collecting member in the chamber in the housing between the inlet opening and
15 the outlet opening;

16
17 providing a cap member having a pass through opening, the cap member adapted to be sealingly
18 connected to the housing so that the pass through opening is in direct fluid communication with
19 the inlet opening in the housing;

20
21 providing a flexible hose connected at one end to the opening in the body; and

22
23 drawing gas and particles from the source and through the hose and cap member and into the
24 housing so that the inlet opening directs the gas and particles at the adhesive-coated surface of
25 the collecting member.

1 14. A method of collecting particles as recited in claim 13, further comprising the step of providing
2 a rigid tube connected to the free end of the hose.

1 15. A method for calibrating a particle collection apparatus including a housing defining an
2 enclosed chamber, the housing having an inlet opening providing fluid communication between a
3 source of gas and particles and the chamber, and an outlet opening providing fluid communication
4 between the chamber and the exterior of the housing, the outlet opening adapted to be connected to a
5 fluid flow producing means for drawing gas and particles through the housing from the inlet opening
6 to the outlet opening, and a collecting member disposed in the chamber in the housing between the
7 inlet opening and the outlet opening, the collecting member having at least a portion of an upper
8 surface positioned adjacent to the inlet opening such that, when gas and particles are drawn from the
9 source of gas and particles and through the housing, the inlet opening directs the gas and particles at
10 the portion of the surface of the collecting member, the calibration method comprising the steps of:

11
12 providing a cap member having a pass through opening, the cap member adapted to be sealingly
13 connected to the housing so that the pass through opening is in direct fluid communication with
14 the inlet opening in the housing;

16 providing a flexible hose connected at one end to the opening in the body; and
17
18 drawing gas and particles from the source and through the hose and cap member and into the
19 housing so that the inlet opening directs the gas and particles at the adhesive-coated surface of
20 the collecting member.